

E P T E M B E R . 1 9 4 4

GRAIN

Heard Anything On Unloaders?

Have you heard anything more about the car unloaders that were discussed so thoroughly at the SOGES convention? I wish someone would give us some workable device soon.—R. B. Pow, Reliance Grain Co., Ltd., Fort William.

Lost SS Cards Cost

Replacing 1,861,871 lost Social Security cards last year cost Uncle Sam the price of 550 jeeps. Hang on to yours.

Veterans Re-employment Aided

All manpower controls for veterans of the present war have been lifted to speed re-employment and to remove all employment obstacles in the way of their return to civilian life. Statements of availability are hereafter unnecessary, as are referral from USES, etc.

Three hundred and seventy-three million dollars went up in smoke last year! This is the estimated cost of fire accidents, the National Board of Fire Underwriters reports.

OUR FRONT COVER

The striking picture on this month's front cover shows the imposing storage and a small section of the processing operations of the Robin Hood Mills at Saskatoon, Sask. Picturesquely nestled in the middle of a prairie on the outskirts of the city—in the very heart of the wheat belt, the plant originally had but 400,000 bu. storage capacity, 1,250 bbls. flour grinding capacity. That was in 1927.

Two short years later 900,000 bu. grain storage and 1,500 bbls. flour grinding capacity were added along with increased warehouse and office space. Since then the plant has been growing steadily. The electric sign atop the 211 ft. headhouse is visible for 40 miles on a clear night.

The storage unit of two rows of tanks with interstices is served by one tripper belt and one mixing belt. The two unloading pits feed into a single intake belt. Wagon and truck lots are conveyed underneath the tracks by a screw conveyor and elevated into bins in the headhouse by a separate leg.

A new, comprehensive dust collection system is now being installed throughout the plant.—Courtesy of *The Grist*.

Only Class 2 Group G

Relative to the expressions favoring leniency on bin lighting equipment, would suggest the recommendations of the Minneapolis committee be followed. Class 2 Group G equipment is mandatory according to the NFPA code governing our industry.

The installation of the flood light equipment will not be a hardship for anyone as soon as it is made more readily available. The entire practice of using the ordinary drop cord extensions is considered by everyone I have contacted as a very dangerous practice and should certainly be discontinued.—Paul H. Christensen, Van Dusen-Harrington Co., Minneapolis.

Just Like Mother's Day

Fire Prevention Week this year falls on Oct. 8-14th. But, says Steve Halac of The Glidden Co., president of the Chicago SOGES Chapter, we should consider it just like Mother's Day, i.e., every day of the year.

Trading Post

Herewith is the "Trading Post." It was suggested at the recent SOGES convention that this be made a "clearing house" for all surplus and/or wanted equipment. Here it is. Make use of it today.

PREWAR QUALITY— QUICK DELIVERIES— LOW ULTIMATE COST!



Wartime scarcities are forcing many belt manufacturers to use substitute materials resulting in lowered quality; also deliveries are slow in general.

Contrasted to this is the fortunate position of the Imperial Belting Company who, foreseeing scarcities, early contracted for volume purchases of raw materials sufficient to maintain quality at prewar standards throughout hostilities. The REXALL belts, currently produced, are exactly the same as prewar belts.

Deliveries are prompt so far (we have many letters of appreciation for our delivery service) but heavy sales volume and recent critical developments with cotton duck will soon interfere. We strongly urge forward purchases for your protection.

The evidence of Rexall efficiency is our performance records. They are yours for the asking.

IMPERIAL BELTING COMPANY
1750 S. KILBOURN CHICAGO 23, ILL.

Electrostatics and Transmission

By WAYNE DAVIES, M. E.

Chief Engineer, Chicago Belting Company

Before Chicago Chapter, Society of Grain Elevator Superintendents

PRACTICALLY any form of friction will produce static electricity—the first form ever generated by man. The old revolving disc static machines and Leyden jars in physics laboratories of a few years ago are examples, and the earliest electric laws and formulas were based on these electrostatic experiments.

Benjamin Franklin was more curious and considerably more courageous than his contemporaries. He was the first to identify lightning as electricity, and lightning, being "static," was identified with the only electricity known in Franklin's day. Since the discovery of current electricity and its uses, we have spent little time in purposely generating static, but its accidental generation has cost millions of dollars in fires and explosions in all parts of the country.

One of the most common manifestations of static electricity is the rasping, crackling noise often heard during radio reception. This noise usually is due to electromagnetic waves from distant sparks or, more directly, to actual discharge through the receiving set of electricity picked up from the overcharged atmosphere. Another manifestation is the stinging spark you get when you touch metal after sliding your feet across a dry carpet in a dry room.

Although static electricity is one of the most common phenomena, it cannot always be detected except with delicate instruments, and it frequently escapes notice until the charge is built up to a point of discharge, or until some object is moved close enough to receive the charge either by contact or across a short gap.

Static Electricity "At Rest"

SCIENTISTS now believe electricity to be the fundamental constituent of all matter. Electricity may be either at rest or in motion. Static electricity means at rest, and current electricity means in motion. The accumulation of electricity which manifests itself in thunderstorms is an electrostatic phenomenon. It is believed that the circulation of warm, dry air and cool air currents in the atmosphere cause more than 40,000 thunderstorms daily, considering the whole air strata surrounding the earth's surface. The flashes of lightning which result are occurring at the

rate of about 100 each second of time, so our earth and the surrounding atmosphere are always heavily charged with static electricity.

In all electrical experiments, positive and negative electricity are produced or disappear at the same time and in equal amounts; also, charges may be absorbed or conducted by some materials more readily than others.

In our present knowledge, friction of some sort is the cause of all static electricity, and the word "electricity" itself comes from the Greek word for "amber," spelled in Greek "E-inverted-V-E-K-T-P-O-V" — electron. More than 2,200 years after the ancient Greeks discovered that amber, rubbed with wool or cat's fur, attracted lighter objects, we coined the terms "electric" and "electricity" from it to describe the phenomena which now plays such an important part in our lives.

Static Charge Remains

SINCE 1734 it has been known that there are two kinds of electricity—positive, which may be produced on a dry glass rod rubbed with silk, and negative, the kind produced on sealing wax or hard rubber when rubbed with cat's fur or wool. Early studies of electrostatics led to the compilation of materials in "electrostatic series," and the following list, taken from an old handbook on physics, was arranged in order of the static absorption of these various materials: 1—cat skin; 2—flannel; 3—ivory; 4—rock crystal; 5—glass; 6—cotton; 7—silk; 8—the hand; 9—wood; 10—metals; 11—India rubber; 12—sealing wax; 13—resin; 14—sulphur, and 15—gutta-percha.

These substances were known to be better for the generation or conduction of static electricity, the only kind known at that time, although many of them are nonconductors of electric current. Static electricity, being generated by friction, is absorbed largely on the surface of any body or material being charged. Any insulated material can be charged when dry more easily than when damp, and it

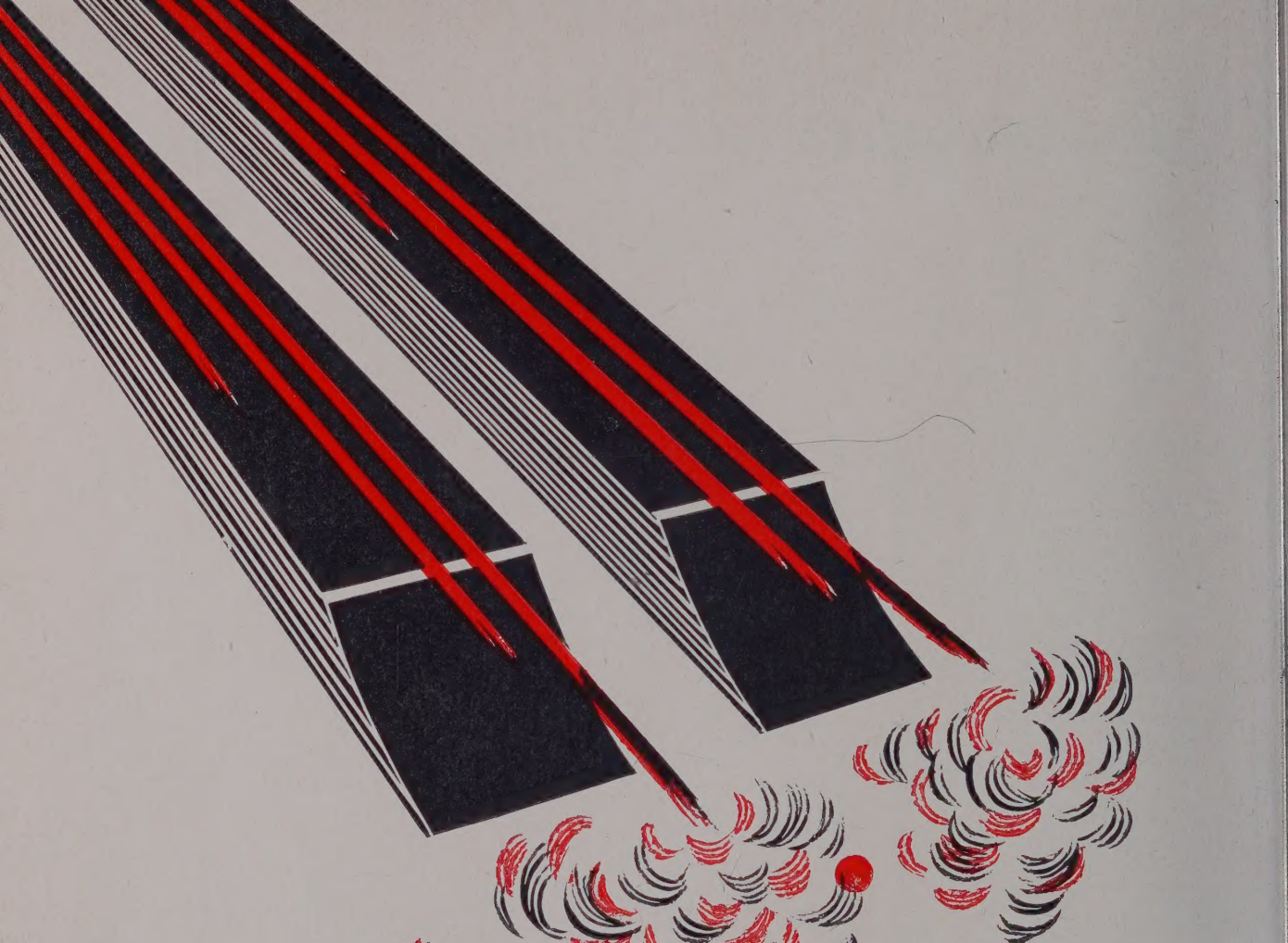
is known that the electrical charge on the surface of any body is collected more heavily on the curve of such a surface.

The kind of charge generated by friction between two bodies depends upon their nature, and the charges, positive and negative, will be of equal magnitude. The effort of such a charge to balance between two bodies, from charged to uncharged, or from a generating body to another body within range which has a lower charge or no charge, causes the spark which enters your body through the finger when held near a statically charged object, or which jumps from your finger when you have generated the charge yourself.

Conditions on paper machines are perfect for the generation of static electricity; that is, toward the calendar, and after the paper has been thoroughly dried by contact with the steam-heated drying drums. The pressure of the paper against the cylinders and the consequent distortion of fiber within the paper itself, or the slight slippage of the dry paper on the heated drum in a very dry atmosphere, develops a static charge which causes much trouble in a paper plant. This charge remains in the paper in a dry atmosphere for a long time.

Friction Causes Static

STATIC electricity can be generated in so many different ways that when we are confronted by a problem involving the danger of static sparks or static charges, we must investigate friction and pressure between any two surfaces or bodies, or even friction of the bodies with the atmosphere itself.



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Robertson Safety Ventilators not only reduce the hazard of secondary explosions, they also minimize the risk of primary explosions with gravity action that continuously VENTS dangerous fine dust from your elevator legs.

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Pittsburgh, Pa.

Simple and efficient instruments for the location or measurement of static charges can be made or purchased easily.

Most of us have amused ourselves by holding a finger near the edge of a rope drive or a belt in motion, watching the spark jump the gap. Sometimes we have been surprised at its force, and often disappointed when we found no sparks. Few of us have investigated this phenomena to learn why there was no spark or why it was so hot.

It appears that few have investigated static in belting much beyond the finger test, although static from one cause or another costs a good deal of money each year in losses from fire and explosions. Those who have tried to cure this manifestation of the oldest known electrical phenomena have usually gone about the cure from the wrong end of the problem, attempting to cure the trouble after the static charge was generated instead of preventing its generation.

If cork and dry glass are pressed firmly together and then separated quickly, they will be charged. Rubber truck tires, distorting and contracting as they roll along a pavement, cause a slight movement, or creep, of certain surfaces meeting and separating. The static so greatly feared by gasoline truck drivers is probably developed like the cork and glass of earlier experiments.

Electrical Generation Phenomena

A GLASS tube partly filled with mercury, perfectly dry, sealed at each end, generates a static charge when the mercury is rolled from end to end. Glass dipped in dry mercury and removed takes on an electrical charge of noticeable capacity; a wax-coated metal ball, immersed in distilled water, acquires a strong negative charge. When pieces of wax, icicles, sugar, or other crystalline or fibrous substances are broken apart, the separate pieces show electrical charges of different signs, positive and negative. The friction of particles or fibers separating seems to be the cause of this phenomena.

Rubber "friction tape" shows a decided glow, apparently a row of small sparks, when pulled off the original roll or peeled away from a glass plate in the dark. From these phenomena we may draw certain conclusions as to the generation of static electrical charges.

Transmission belting often has been credited with the generation of a charge which, in all probability, was caused by other friction. We have a wood-saw in our plant used for sawing up scrap lumber. The saw mandrel is mounted under a wooden table on an oversized shaft in plain iron bearings, and the steel plate around the saw blade is insulated by the wooden top of the saw table. The saw running idle at a comparatively low saw speed develops a very high voltage from bearing friction, for there can be no

belt slippage on the idling saw, no creep, since the belt is very loose, and very little pressure between belt and pulley, which is of steel. The only other source of an electrical charge in this saw might be the lineshaft or overhead transmission, and on this there is no charge whatever.

There are several causes for the collection and generation of static electricity on belting. The first and most common cause is dry atmosphere. Static electricity cannot be generated easily in damp atmosphere, so the easiest way to prevent static charges from forming in a plant is to humidify the air slightly or to a point where the static electricity is carried off or absorbed in the air.

Slippage in Belting

STATIC electricity may be developed by any belt of any material, even by a steel belt or band saw, as no form of transmission belting is free entirely from this phenomena. While some types of belt have been considered as developing and holding charges more readily, investigation of many such cases has proven that the atmospheric conditions had more to do with the amount and strength of the charge or its duration than the belt material itself, as static is largely a surface charge. Rubber belt has a lower coefficient of friction than leather, and is of course generally drier, hence, for the same loads and tension, slips more easily. Very often where conditions are ideal for the generation of static, the slippage is responsible for the static.

Belt slippage is rare in an elevator leg, and bucket belt speeds are considerably lower than transmission speeds, but under the conditions of dry, hot atmosphere, the woven fabric leg belts will develop a noticeable charge. Of course, in this atmosphere, the charge stays on the belt until heavy enough to discharge to some convenient metal part.

We have a leather belt operating in a cereal mill in Chicago at a speed of 8,300 feet per minute. The belt, being only 11 feet 6 inches long, makes 720 circuits per minute around

the two pulleys. It develops no static charge whatever in a reasonably dry atmosphere because the belt is properly dressed with animal oils, and although developing a high pressure against the pulley surfaces, separating from the leaving side of the two pulleys at a speed more than twice that of the average drive, and with a very high air friction to consider, it shows not the slightest amount of electrostatic charge.

If this belt were allowed to dry out so the leather fiber developed a friction within the body of the belt and by slippage on the pulleys, the dry surfaces of the belt passing through the dry atmosphere surrounding it, together with the pressure of the belt against the pulleys approaching and leaving at this tremendous speed, this drive would develop an enormous amount of static electricity, very dangerous because of its high speed generation and the danger of an almost constant discharge to adjoining equipment. Such a charge, under the most favorable conditions, can be built up to 80,000 or 100,000 volts, or higher, and could easily spray a fan of sparks two or three feet in length.

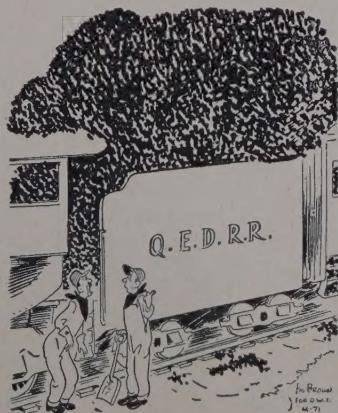
Cause Often Uncertain

WE HAVE found some mysterious static problems in certain industrial plants, such as three air compressors in the same room, all supposedly identical belt-driven installations. One of these drives developed static electricity in heavy charges, while neither of the other two showed any charge whatsoever when tested by the simple "rule of thumb" test. The three installations could not be identical, however, because belt tensions on three average drives could not be measured nor regulated exactly the same.

There are several other conditions which at first thought are assumed as identical but are found quite different when carefully examined. Belt tension is pressure against the pulleys, and pressure, as well as the subsequent separation on the leaving side of each pulley, helps to determine the amount of static electricity produced. This could hardly be gauged to exactly the same amount. Friction and internal fiber distortion vary considerably with pulley crown and pulley alignment. There are two many variables to leave any mystery.

The condition of the belt itself has a bearing on the problem, as have the driven loads on the various compressors and the actual operation of the compressors themselves, their valves and unloaders. All these contribute to the matter of slippage, as do even the bearings of the motor and the compressor. And again we have the grounding of the compressors. Although none of them require grounding by installation, the ones showing static may have been completely insulated, or more poorly grounded, than the others.

From my own point of view as a transmission engineer, it has always



"I THOUGHT THE GOVERNMENT WANTED US TO LAY IN OUR WINTER'S COAL NOW!"

seemed that the most practical way to prevent static in transmission belts was proper transmission design, reasonable leads, high quality belting with a good gripping surface, and careful maintenance of belting, bearings, shafting, and other equipment used in the transmission of power, as well as proper ventilation. We have seen many attempts in the past toward a cure for static on transmission drives by the use of a belt dressing in which some form of carbon or electrical conductors was compounded in the dressing itself. We have even seen "staticproof" belts with copper ground wires incorporated in the belt construction, but all of these seem to me to be attempts at a cure when the old "ounce of prevention" should be the logical procedure.

Good Belting Will Not Charge

A LEATHER belt with a high coefficient of friction operating on a properly designed drive where the load falls within the range of safe driving, without more than 1 to 1½% slippage (which is barely over the limit of creep, and perfectly natural) will develop no static charge if the leather in both plies is treated with oil periodically, or dressed with any one of a number of vegetable oils which keep the leather in perfect condition and prevents internal friction in the leather fibers.

Where it is impossible to prevent static on transmission equipment, grounds or leaks may be provided to dissipate or absorb the charge. Copper wire leads can be run from machine frames to water pipes for grounds, handrails near moving belts can be grounded in the same way. Jack shafts and lineshaft hangers can be grounded so that practically no metal parts are left ungrounded for the collection of a static charge.

Static may be developed in hammer mills or attrition mills from the conditions under which they happen to be operating or the kind of material being treated, assisted, of course, by the atmospheric conditions. When static is found in such equipment, it can be carried off easily by proper grounds.

For the detection and measurement of electrostatic charges in machines a simple volt meter can be constructed by the use of two needles set in insulated columns with their points toward each other, with one of them arranged to slide back and forth to reduce or increase the gap between their points. When these points are separated to a distance of one inch a charge of 20,000 volts static is required to jump this gap. A one fourth inch gap requires 5,000 volts to jump, and other gaps of greater width require voltage in direct proportion.

Regulating Humidity

A NOTHER simple volt meter for the measurement of electrostatic charges can be made with three thin sheets of aluminum arranged in paral-

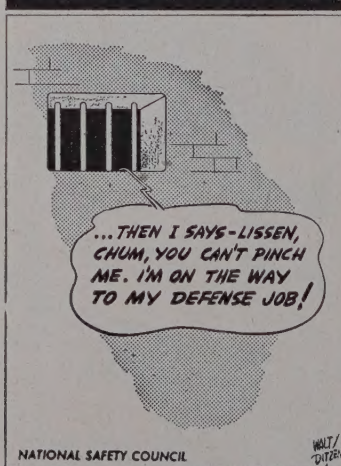
lel planes with about one half inch between their surfaces, having the two outer sheets fixed on an insulated frame or in a glass box, with the inner plate pivoted on an axis perpendicular to the planes and insulated from the outer plates so it can swing in its plane through an arc of about 90 degrees. A light pointer on one end of the center plate can be arranged to swing on a calibrated scale so that the exact voltage from any charge can be read. This instrument is connected to a charged body through the contact of a wire from the machine to be checked to the two outside plates. A very practical method for calibrating the scale for such an instrument is to check it against the needle type volt meter described just above.

The exact percentage of relative humidity, or just what hygrometric state is dangerous in industrial plants depends, of course, to a large extent on the operation or product in that plant. Thirty per cent relative humidity is considered as equal to an open desert. In some processes, 40% to 50% would cause no trouble, while in others humidity as low as this might be almost dangerous. Anything below 30% is certainly dangerous, and machines should either be grounded or steps taken to raise the percentage of humidity, checking this with the wet and dry bulb thermometers.

In closing, it might be well to point out again that the cause of any electrostatic charge is friction, and that this friction can be developed in a bearing, even under oil. Careful maintenance of all transmission equipment, proper elimination, regular inspections and tests for even low static charges, proper ventilation in plants when manufactured humidity is not practical, will cut down the mystery of electrostatics and many losses from fire and explosions.

The acorns grow
To mighty oaks
And big fires blow
From little smokes!

ACCIDENTS HELP THE AXIS



...THEN I SAYE-LISSEN,
CHUM, YOU CAN'T PINCH
ME. I'M ON THE WAY
TO MY DEFENSE JOB!

Electricity For Grain Drying

Writing in the *Electrical Review*, Mr. A. W. Allwood, technical assistant, Norwich Corporation Electricity Department, says: The letter from the consumers' engineer of the Bedford Electricity Department rises a question which is receiving a considerable amount of attention by this undertaking at the present time.

There is no doubt that the ease and reliability of control of temperature which can be obtained by electrical heating methods is infinitely superior to that which can be attained when solid fuel is used. The one disadvantage is the considerably increased cost of the heating medium. Whilst this is partially offset by reduced labour costs and a smaller risk of possible loss due to overheating, mentioned by Mr. Wild, it is obvious that if electric heating is to be developed for this purpose something more than the mere substitution of an electric heater for the usual coke furnace is necessary in order to reduce the heating costs. It is also essential that electricity should be offered for this purpose at a tariff which makes it commercially practicable.

This load, in general, only occurs in the summer, although some re-drying is occasionally carried out in the winter. In spite of the very low annual load factor it appears that it is an economical proposition from the point of view of the undertaking to supply energy at the "unit" charge of the domestic or business tariff, providing that the load is kept off the undertaking's peak. Even so, more requires to be done, and if any headway is to be made in electric drying it is essential that a drying equipment designed solely for electricity as the heating medium should be developed.

From some preliminary investigations carried out in this undertaking, there is good reason to think that such a dryer can be designed which, in a size having an output of two tons of dry grain per hour, will not have a maximum loading of more than 120 kW, which is about 60 per cent. of the loadings that have commonly been mentioned in connection with this problem.

There are three ways of carrying out electric drying which we are investigating, namely, by air heating, infra-red heating and radio-frequency heating. Many factors will need to be considered, including consumption, capital costs, and the simplicity of control by the farmer or his staff. Further development can best be carried out by somebody having adequate facilities and able to obtain the co-operation of manufacturers. For this reason I should like to support Mr. Wild's suggestion that this is a matter worthy of the attention of the Electrical Research Association.—*The Miller, London.*

Killed In Inaction . . . Those are the War Bonds redeemed before maturity.

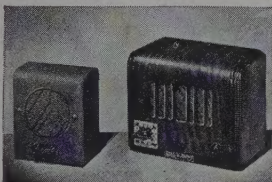
It Will Pay You to Come to HEADQUARTERS

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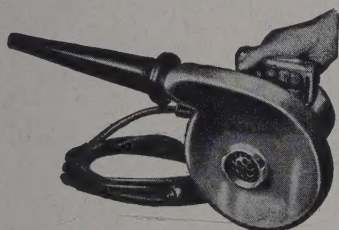
Choose from a wide range of products ... over 350 different items ... all made of finest materials by skilled craftsmen ... all rigidly inspected. Government Standards are strictly adhered to where specifications are available. All merchandise is fully guaranteed. Seedburo was founded in 1912 by recognized authorities in the seed and grain trades. It will pay you to order from "Headquarters".

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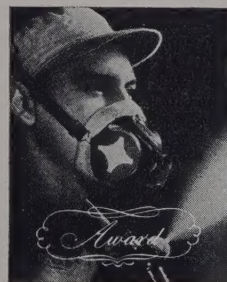
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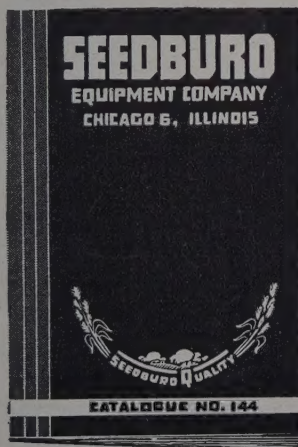
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The No. 66 Dupor Respirator provides low cost protection from dust. Has two large felt filter pads, entrance aperture 7 $\frac{1}{2}$ sq. in. Made of soft high grade rubber. Wt. 4 oz. Price \$1.65.



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Milling Wheat

By EDGAR S. MILLER*

Before Society of Grain Elevator Superintendents

AS USED in the title of this paper, "milling" is an adjective, not a verb. Granted that most of the members of this Society would not be interested in the milling of wheat, since they are not millers, nevertheless they **MUST** be concerned about wheat that is intended for milling into flour.

Although there are many and varied uses for wheat today its highest value still is, and has been for thousands of years, as food for human beings. In its primal state, however, it is not a suitable food. For centuries men have milled it and transformed the flour produced from the greater part of it into breadstuffs of one kind or another, viz. the unleavened or poorly-leavened breads of the ancients, the "hard tack" or sea biscuit, the "soda cracker," the hot "short" breads (muffins, biscuits, et cetera), the old-fashioned "salt-rising" bread, and the loaf made with yeast for many years baked by the housewife and now obtainable at its best in North America fresh at least once every day from the higher grade commercial bakers.

"Sound" Wheat No Criterion

THE manufacture of flour is not the simple and easy job which many suppose it to be. The milling process is extremely intricate, and the mere fact that the wheat coming to the mill is sound and in "good condition," so far as any of the standards set up for grading are concerned, is not a guarantee that the flour milled from it will be acceptable for a particular type of baked goods—or for any high quality baked goods, for that matter.

It is often very difficult to determine whether the fault lies intrinsically in the grain or whether it is in the process of milling, and it is not to be wondered at that this matter is frequently the cause—or possibly the excuse—for controversy between the man who selects the wheat and the one responsible for the operation of the mill.

That all the properties of wheat cannot be readily identified by physical or chemical analysis is unfortunate. They cannot be balanced against standards, and so mixed up are chemical and physical characteristics that we have learned only a very little about what we think we

want to know when we have estimated the protein content by the nitrogen method, determined acidity, measured soluble carbohydrates, ascertained the weight of a struck bushel or even the specific gravity of representative individual berries.

Synthesis Depended Upon Most

IN SELECTING wheat for milling, the quantitative protein test is the only analytical procedure in the field of chemistry commonly used unless samples are milled experimentally. Even then it is synthesis—the making of a loaf from the milled flour and numerous other ingredients—that is depended upon most. This is almost inevitable, considering the time element.

Naturally, it is not always the intrinsic properties of the wheat that are to be blamed when things go wrong in the mill, the laboratory and the bakeshop. Operative millers have known for many years that many of the difficulties they ran up against were due to an unfavorable physical condition of the wheat berries when they reached the first break roll, and for many years they have been trying to find a solution for the problem.

In North America—at least in the United States—the conditioning of the mill-mix has mostly been a haphazard procedure, resulting in a fairly good operating situation when nature was kind enough to do the greater part of the conditioning in the field, the

shock or the stack. But even at the best there have always been occasions when adverse conditions which apparently could not be cured had to be endured.

It need not be said that the wheat the miller takes in for milling must be in "good condition," meaning by that that it must be in a good state of preservation, undamaged by heating or by molds, or by the depredations of insect pests. It is presumed, also, that good milling wheat is wheat that had reached a fair state of maturity at harvest. Frosted and shriveled berries are, of course, dross. The miller expects to get some of one or the other, or of both, but he cannot be expected to call them "good."

Cleaners Always Busy

A GREAT deal of effort is expended in the mill in separating out various substances which grading rules permit in wheats of high grade, but that situation is not responsible for the milling difficulties under discussion. There are many machines available that will do an excellent job of separating and cleaning wheat, and a gratifying number have been installed within the past two or three years. Nevertheless, there probably was never a time within the memory of the active operative millers throughout North America when mills in as many localities have had as many milling troubles (particularly with respect to the baking characteristics of the flour produced) as was the case with the crop harvested a few years back.

Within the three months following the harvesting of this crop literally hundreds of operative millers and not a few cereal chemists expressed themselves as convinced that the mineral content of the wheat's endosperm was excessively high, that "low-ash" flour could not be produced from it, and that the flour made necessarily had poor baking quality.

Bad Wheat "Reformed"

THAT this was a mistaken premise in at least a goodly number of instances has been proved. A great deal of the wheat of this harvest produced flour with reasonably low ash content and with excellent baking qualities, and it is quite impossible that all the "bad" wheat so prevalent



WHAT! ONLY FIVE MINUTES TO TELL HIM 'YES'?

at one time was dumped into the ocean. It may seem foolish to suggest that after a period of unruliness much of the "bad" wheat "reformed"—but that seems to describe very nearly what must have occurred.

It is a common thing for operative millers who receive wheat from terminal elevators to convince themselves and try to convince their employers that virtually every deficiency of operation as well as every fault of the resultant flour can be traced to manipulations of the elevator operative.

The odd thing about the troubles arising with this particular crop, however, is that they were at their worst the nearer the wheat was to the grower. Mills grinding wheat harvested in adjacent fields, or fields not far distant, ran into plenty of difficulties although the grain was never out of the hands of their own men nor in any bins but their own.

In some sections of the great wheat belt conditions were much worse than in others, but from the Northwest and Southwest on down into the Central States, if not farther, there were expressions to the effect that something was seriously wrong with the current crop of wheat and that nothing could be done about it. And yet, it appears that something *was* done about it, and there is much evidence that the greatest doer of them all was old Mother Nature.

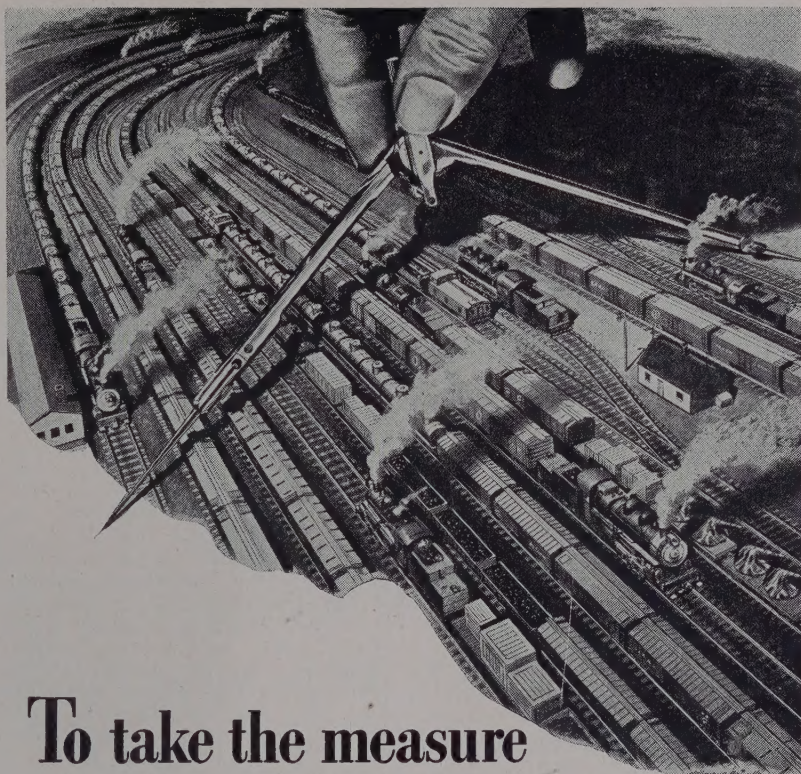
Actually Know Little of Grains

WITH all respect to the members of this Society as well as to operative millers, cereal chemists and other earnest investigators, it may be said truthfully that less is known about the raw material of the miller than about almost any other substance which man processes to meet our present-day needs. It is easy to think of wheat or other grains as inert, like sand or the metals, but the fact is that every berry that is fit for milling is an individual living entity.

The most wonderful metals of these modern times are alloys, or at least alloys of metals with definite and stable characteristics treated or mixed with other elements just as stable and in just as definite quantities, while the proportion of the various constituents of wheat are not definite, and none of them, with the exception of the minerals, is even fairly stable. We have learned that much, but little more.

Investigators in the field of wheat and flour technology have never been in full agreement concerning the state, activity and position of the water contained in normal wheat berries, probably because such studies as have been made have for the most part ignored the individual kernel and arrived at conclusions by making deductions based upon the properties of a conglomerate of reduced particles of many individual berries.

For many years operative millers have suspected that mysterious pro-



To take the measure *of a coming job*

FEW people notice or even think of the many special abilities the railroads have been required to develop. One of these is accurately anticipating the need of agriculture and other industry for rail transportation.

Because they do this, freight cars for years have almost always appeared at the right place, at the right time and in the right number. This has been a *must* for orderly marketing and efficient low-cost transportation.

Today, while everything they have is working day and night to hasten victory, the railroads are busy also taking the measure of the jobs that lie ahead.

What new kinds of goods

will have to be carried? What kinds of cars will they need? Where will they come from and where will they go? What service and rates will be needed to develop business, shipping and employment?

Long before the call comes for post-war action, the answers to these and hundreds of other questions must be ready. Finding the answers to these questions is the work of a separate group of seasoned railroaders — the Railroad Committee for the Study of Transportation.

In this way, the railroads are looking ahead to the time when America turns again to peacetime work — and planning their necessary part in helping to make it a wonderful land to live in, just as they have helped make it strong in time of war.



AMERICAN RAILROADS

ALL UNITED FOR VICTORY

cesses were at work in the grain at least from the time of harvest until the "sweating period" was concluded, but neither they nor scientists far better qualified to learn about such things have formed a complete theory and substantiated it. But what gives promise of being a theory wholly within the bounds of known natural laws has been suggested recently, and there is reason to believe that it is worth following up.

"Bound" Vs. "Free" Moisture

ALTHOUGH there have been several vague references in the past to "bound water," as opposed to "free," in connection with the phenomena mentioned, two investigators at Kansas State College set forth some interesting facts which suggest an angle of approach to the admittedly still unsolved problem. Referring to two experiments described by Mr. J. E. Anderson first, because of the bearing the results may have on the subject later discussed by Mr. R. J. Clark, there is apparently considerable significance in the data recorded.

In one experiment Mr. Anderson made careful observation of a quantity of rather dry wheat to which water had been added under controlled conditions. Briefly, with room temperature identical with that of the wheat and water at the time of mixing, there was a gradual rise in the grain over a definite period of time and then a horizontal straightening off of the curve. The heat involved must have been the product of molecular disturbance in the constituents of the grain, and it is evident that this disturbance stopped as the temperature curve reached its highest point. Which is to say that with the amount of water available penetration proceeded no further.

The other experiment had to do with the electrical conductivity of a sample of wheat treated with water under the same conditions. In this it was shown that resistance to the passage of current was lowest when the added water was either upon the surface or within the bran-coats, and that it increased almost exactly as did temperature, rising to a maximum in almost the same number of minutes and then remaining virtually constant. This seems to corroborate the indications of the first mentioned experi-

ments—that with the quantity of water available, penetration proceeds so far and then stops.

Neither Messrs. Anderson, Clark nor R. O. Pence, instructor of milling in the college mill, considered the wheat satisfactorily "conditioned," notwithstanding that the moisture content was sufficiently high and that the evidence pointed to complete penetration. And here Mr. Clark's observations seem pertinent.

Constituents of Each Kernel Different

HE suggested that with respect to the experiments, as well as to the recorded behavior of milling wheat "tempered" in commercial mills, the added water all remained "free," and that the constituents of the kernels actually differed in composition from those of wheats matured and harvested under normal conditions entirely because of that fact.

He did not infer that some of the added water would enter into chemical composition if sufficient time were allowed, but he did suggest that when "free" water becomes "bound," phenomena somewhat similar to that having to do with the "trapping" of water as crystals are formed by the chemical constituents of many common substances are in evidence.

The protein particles of the endosperm are too small to be seen with the aid of a powerful microscope, and it is therefore impossible to study their behavior in the presence of water directly.

We can only deduce by reasoning, and even if the analogy is far-fetched, it is still interesting to consider what occurs when particles of calcined cement encounter liquid water. Although these particles, under the microscope, appear as distinct granules, when they are brought into contact with water an immediate formation of fibrils takes place. These fibrils look like tiny animated threads, and as you watch they turn and twist and lock themselves together. Particles of water are entrapped. They are "bound," not "free."

Gluten Forms Fibrils

C. O. SWANSON, one of the greatest students of wheat and its proteins of all times, opined that the constituents of gluten associate themselves to form fibrils in the presence

of water. Perhaps there is no unquestionable evidence that the phenomenon is similar to that attending the "setting" of cement, but the thought does not seem so very fantastic.

All practical millers are aware that when they receive wheat with a moisture content of 10% and add sufficient water to raise the percentage to 15% they cannot get the grain to behave as will a similar wheat containing, say, 12% or 13% originally. Mr. Clark described "pre-tempering" as practiced in a number of mills on the wheat of the crop in question, and explained that with water added in the storage elevator to take care of the deficiency (as compared with "normal" grain) it required weeks of time to bring about a condition in which it might be said that the "bound water" requirements were satisfied.

Sometimes a theory to the effect that dry wheat cannot be satisfactorily conditioned with liquid water is advanced. It is obvious that the quantity of water in the form of vapor possible to introduce into a wheat berry is infinitesimal. It is apparent however, that the moisture content of grain does increase materially when the only source of water is vapor. Condensation is of course involved, and there are two ways in which condensation and absorption can be brought about. One involves the absorption by the grain of the latent heat of condensation as the cause; the other merely the molecular affinity of the grain's constituents for water.

Two Processes Combine to Boost Moisture Content

WHEN dry wheat in handling is brought in contact with air containing a large quantity of vapor, some vapor will be condensed and absorbed. As the grain cools off (by losing heat at night, for example) it will be able to absorb some heat of condensation, and the two processes will work together to increase the moisture content.

Probably the moisture taken in in this manner satisfies the "bound water" requirements first, for we know that when harvested grain was exposed to the action of the winds but not the water of rain, in the stack, there was not the problem that exists today. We are not going back to the old methods, but we may possibly learn from them how to solve our present-day problem when wheat is harvested under hot and very dry conditions.

Grain can be made to absorb the water vapor and if the infinitesimal droplets formed during condensation serve the purpose of satisfying the "bound water" needs better than water added as an ordinary liquid can, means for setting the process in motion should not be beyond the capabilities of either the miller or the handler of grain.

*Mr. Miller is the well-known technical editor of "American Miller" and previously held a similar post with "Northwestern Miller."

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INFESTATION IS BIG PROBLEM

IN CANADIAN GRAIN THIS YEAR

THE rust-red grain beetle (*Laemophloeus ferrugineus* Steph.) was reported more frequently and caused more serious infestations than any other insect pest of stored grain, during 1943. Although this insect attacks only the germ of the wheat berry, its ability to initiate heating even in dry grain has been the cause for much concern.

As previously, infestations of rust-red grain beetles occurred chiefly in the temporary annexes. Most of these buildings are now three years old and moisture often gains access to the grain through breaches in the walls and settling of the floors. The resulting local areas of "tough" grain serve as nuclei for the initiation of heavy insect infestations which soon spread in the dry grain. Farm-stored grain throughout the Prairie Provinces has also been subject to attack by the rust-red beetle.

The Indian meal moth (*Plodia interpunctella*, Hbn.) has become an important pest of stored grain in the Bay port elevators. The larva of this insect completely destroys the germ of the wheat kernel and fouls the grain with a heavy webbing.

Will Attack Very Dry Grain

These insects will attack very dry grain, and heavy infested grain may heat. Apparently, the insects can survive the eastern winters and large populations may be built up during the following summer. Fortunately, this insect seldom penetrates more than four feet below the surface of the grain.

Grain weevils (*Sitophilus granarius* L. and *Sitophilus oryzae* L.) were responsible for four infestations in the corn growing area of southern Manitoba. None of these infestations was particularly severe, but the introduction of these primary grain pests into western Canada is a matter of concern.

Preventive and control measures have been widely applied. To prevent the spreading of grain weevils, all infested grain has been fumigated and diverted into local mills or feed-houses. In co-operation with the Dominion Division of Plant Protection a system of three annual inspections of the Bay port elevators has been put in operation.

Indian meal moth infestations in these elevators have been controlled by the use of insecticidal sprays and fumigation. The effectiveness of routine treatment with an insecticidal spray as a preventive measure was demonstrated in one elevator where

formerly the Indian meal moth was a severe pest.

Clean and Turn Grain Besides Fumigating

Fumigation is often used successfully against rust-red grain beetles but turning and cleaning the grain is more often implemented. Cars carrying infested grain to the Lakehead are inspected and, when necessary,

treated, before being returned to the west. Farmers have been advised of the advantages of turning "tough" grain in cold weather and of cleaning infested grain over screens or by means of threshing machines or combines.

These various efforts have resulted in a well-integrated system for the detection and control of insects in Canadian stored grain. It is a tribute to the vigilance being maintained by the grain trade that losses to date may be stated in terms of outlay for control measures rather than actual losses of stored grain.—Annual Report of Dominion Grain Research Laboratory.

"GOOD KILLS"
ARE NOT ALL YOU SHOULD EXPECT
FROM YOUR FUMIGANT!

Good Kills should include egg life and larvae inside the grain berry.

Your fumigant should be **EASY TO APPLY** to grain, incoming or in turning; it should be **ECONOMICAL**—as little as \$1.50—1.70 per thousand bushels, in closed concrete bins.

It should **UNMISTAKABLY WARN OF ITS PRESENCE**—to keep down risk of accident . . . and be **NON-INFLAMMABLE AND NON-EXPLOSIVE**.

It should kill **RODENTS** in your warehouse, sacked grain and feed, without carcass nuisance, leaving carcasses so you can sweep them up for disposal.

Every one of these requirements is met with

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DUST EXPLOSIONS

By JESS SMITH, Associated Millers of Kansas Wheat, Kansas City

AT the time of the Central States Safety Congress in Kansas City, the writer induced Hylton R. Brown, Senior Engineer, Bureau of Mines, U. S. Department of the Interior, College Park, Maryland, to come to Kansas City to deliver an address and give a demonstration on dust explosions. He did an excellent job. There was a large audience which quickly realized they were hearing an expert in his line.

Originally, Mr. Brown's special field was explosion hazards in mines, but gradually dust explosion hazards in all lines of industry have centered in his department and since the war dust explosion hazards in war plants has been one of his government specialties. We consider Mr. Brown the outstanding authority in the country on dust explosions, and fortunately for the milling industry, he has made something of a special study of dust explosions in flour mills and grain elevators.

Not so many years ago it was difficult to convince some persons that dust explosions could occur in connection with any and all kinds of dust—coal dust, wood dust, grain dust, flour, bran and even the metal dusts. It has been proven that dust of practically any and every kind from any and every product, when suspended in a dust cloud in the air, can and will explode under certain conditions. Only inert material (such as rock dust) with a very low ignition point, is resistant to explosion hazards.

Our Industry Most Lax

NOTE the following tabulation of the number of explosions that have occurred to April 1, 1944, in

some 20 different industries—840 explosions, 541 persons killed, 1,294 persons injured and a property loss of \$73,049,322, and note particularly that grain elevators head the list, with flour mills fourth on the list:

- 4—Corn Meal-Alfalfa
- 5—Gluten Meal—Buckwheat Flour
- 6—Wood-Wheat Flour

Wheat flour, being very fine, is explosive when accumulated in a dust cloud. Wheat dust which settles in

EXPLOSIONS TO APRIL 1, 1944

	No.	Killed	Injured	Loss
Grain Elevators	166	122	321	\$38,800,218
Wood Working	102	30	135	2,837,113
Feed and Cereal	94	63	226	7,439,510
Flour Mills	90	28	48	5,662,582
Starch and Corn Products	39	128	130	5,394,826
Cork	37	6	28	181,190
Pulverized Coal	26	21	26	92,359
Sugar Refineries	25	12	31	1,622,300
Fertilizer Plants	26	7	20	852,450
Malt Houses	23	2	18	747,500
Metal Dusts	53	56	105	1,824,465
Sulphur Dusts	23	2	39	80,095
Bark Dusts	14	...	2	587,600
Coffee and Spice	11	5	13	201,700
Cotton Mills	14	2	7	188,950
Paper	7	395,000
Phonograph Records	6	...	1	36,400
Pitch and Resin	15	14	57	2,098,472
Rubber	7	11	2	30,300
Miscellaneous	62	32	85	3,976,292
	840	541	1294	\$73,049,322

Note where starch and corn products come fifth on the list. There has been no loss of life reported in that industry since 1930 after they took precautionary measures, where as there have been over 50 explosions in grain elevators since 1930. The facts warrant the statement that grain elevators and flour mills have not given this subject the attention it demands.

Research on dust explosions has been going on for a number of years and is still being carried on in the Bureau of Mines. Much valuable data has been accumulated. Recently the National Board of Underwriters has used this information in preparing a table which attempts to give a numerical rating to different dusts. The ratings range from 0 to 10, and are based largely on the pressures produced and the rate of pressure rise recorded in the laboratory tests.

Grain Dust High On List

FOR the benefit of those who wish to obtain some idea of the seriousness of the explosion hazards in their plants or make comparisons between the explosive properties of different products, a few examples are given below arranged in the increasing order of inflammability designated by the numerical ratings 0 to 10.

- 0—Graphite-Anthracite
- 1—Carbon Flour-Indigo
- 2—Cocoa-Cottonseed Meal
- 3—Bran-Linseed Meal

an elevator is practically as fine as flour, at least a part of it, and would rate for inflammability next to flour in a mill or elevator, and inasmuch as flour is confined more than wheat dust the danger of wheat dust explosion is greater than flour dust explosion.

Perhaps it is unwise to try to draw any definite distinction between the explosive points of dust, but the above table does give a miller or grain elevator operator some idea how the different dust products rate.

700 lbs. Pressure Per Sq. Ft.

IT is true that some dusts may produce in laboratory tests a pressure of 50 pounds per square inch, while others produce only 5 or 10 pounds, but 5 pounds per square inch is more than 700 pounds per square foot, and that is sufficient to seriously damage or wreck an ordinary building. For this reason it certainly is wise to adopt all possible precautions for prevention wherever a dust explosion hazard exists.

Many articles have been published in technical and trade journals with recommendations for adoption of different methods of explosion control. Fundamentally, they mean (1) Keep your plant free of dust, and (2) Eliminate all possible sources of ignition, such as use of non-sparking electrical and mechanical equipment, avoid shorts in electric circuits, defective sockets, switches, etc.

WARN THE NEW EMPLOYEES

In recent inspections we have found that the new, inexperienced employees, as well as the trimmers and boat crews, have been smoking immediately adjoining elevator properties.

We have not found this practice to be carried on in the elevators themselves for several months, but smoking at the ends of open train sheds or in close proximity to the elevator is definitely a hazard and should be prohibited.—C. E. Harbin, Manager, Underwriters' Grain Ass'n, Chicago.

Regrets won't pay Your Losses -but You can avoid Both by installing



IN recent months, several serious dust explosions in the grain and milling industry have caused huge losses—in some cases over a hundred times what it would have cost for a complete protective dust control system.

Ratings are now being granted for dust control equipment to protect grain handling plants. "FOOD is needed for VICTORY, now!"

PROFIT by EXPERIENCE

The DAY organization has been solving dust control problems for 62 years. DAY facilities include engineering, fabrication and installation of entire systems—large or small—including all required sheet metal work. This experience and equipment are at your service.

The DAY DUAL-CLONE

This patented Dust Collector is the key to the uniformly successful operation of DAY DUST CONTROL Systems. Its advantages include low resistance, high separating efficiency, compact space-saving design, easy installation.

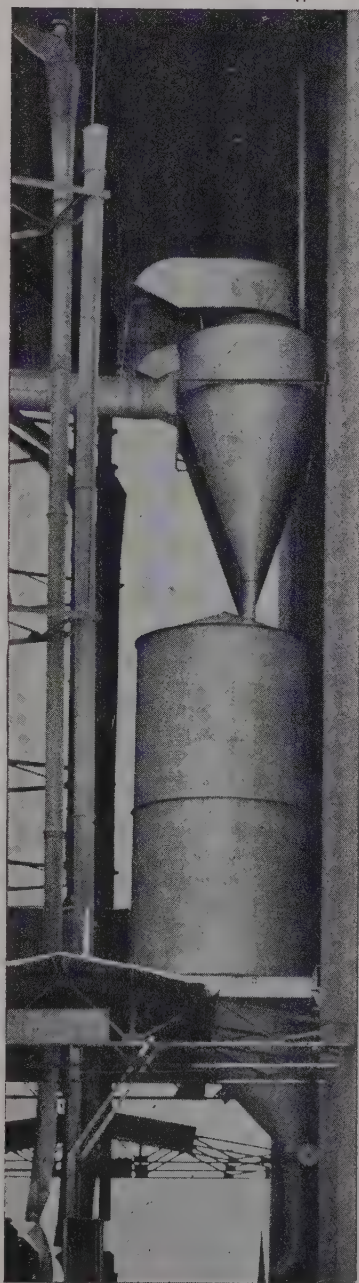
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THE DAY COMPANY

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Minneapolis 13, Minn.

In Canada: The DAY CO. of Canada, Ltd.



One of many types of DAY installations at a grain elevator. The dust is discharged directly from the dust tank into box car below.

Avoid metal products, nails, or anything that will cause sparks on the rolls, in hammermills, etc., nails in shoes on cement floors or metal parts of floors, dropping crowbars or tools on cement floors or on metal; in fact, anything that can cause a spark. Insecticides, certain types of drugs and some types of chemical compounds in a plant are hazards.

In all dusts, particularly grain dusts, some part is coarser than others and when a dust cloud forms, naturally the coarser, heavier particles by gravity accumulate in the lower stratas of the cloud, the finer particles become suspended in the upper stratas.

Where the finer dust particles cloud together, there is where explosion hazard is greatest. This is due to the fact that the finer dust, the more easily it is ignited, and the closer the particles or motes are together, the more easily does the ignition travel from one area to another.

Static Clouds Worst; Dampness Negligible Factor

STATIC or still dust clouds within a closed structure are more hazardous than a similar dust cloud that is moving out of the building through open windows or vents.

As to the effect of humid or damp air in minimizing explosion hazards as compared to dry air, this is only a matter of very small degree and only to the extent that a moist condition is slightly less inflammable than a dry condition.

The foregoing is simply an attempt to touch the high spots, arouse interest in the subject. The Dust Explosion Hazards Committee of the National Fire Protection Association, 60 Battery March, Boston, Massachusetts, has developed a code for the prevention of dust explosions in flour and feed mills, elevators, etc.

Management must pay more attention to this subject, together with their superintendents, engineers and such people around the plant, rather than pay no attention to it and regret

it. From purely a humane standpoint, every precaution to avoid injury and loss of life is the duty of management.

We should adopt a code of preventative measures.

New Dust System To Save Lives, Property

If Jess B. Smith of the Kansas Flour Millers Ass'n can obtain the co-operation of his entire membership in a combined effort to eliminate or reduce the fire and explosion losses the same way you and others are doing in your association then I believe the results will be quite evident when future tabulations are made of losses in different classes of industry.

Dust collection in grain elevators has always been a problem, but the excellent co-operation on the part of Mr. Jos. A. Schmitz (Chicago) and others in the Weighmasters' Association should be very helpful in overcoming this difficulty. Perhaps the readers of "GRAIN" should be reminded that the weighmasters have given permission to apply suction at dusty transfer points, as set forth in a recently printed NFPA bulletin as well as in "GRAIN."—Hylton R. Brown, Senior Engineer, Bureau of Mines, USDI.

Why?

Why are we having more lost-time accidents?

There are many answers to this question, but perhaps the most important one is that management isn't interested enough to try to prevent them.

No use kidding ourselves. We can blame war hysteria, labor turnover, rush of business, but the fact remains that we are having accidents because we aren't interested in safety.

If we HAVEN'T time for safety it just means that we aren't interested enough to find the time. A man spends his time where his interests lie. If he

is interested in machinery his plant will be in top mechanical shape. If he is interested in costs he will squeeze the last ounce of work out. If he is interested in safety he will have a safe plant.

The superintendent's or foreman's record is a direct indication of his interest in accident prevention work.—Exchange.

How Important Is Your Trade Association?

[Here's what Eric Johnston, president of Chamber of Commerce of the United States, has to say on the subject.]

Never before has leadership on the part of industry been so vitally necessary to the welfare of the nation. Never before, in all her adventure-some history, has America entered a period in which this leadership was so urgently needed.

During the last ten or twelve years we have gone through a period of stress and strain. It was initiated by a devastating depression and topped off by a world war of cosmic proportions.

We have gone through times that try men's souls and stretch their nerves to the breaking point. But America has survived and free enterprise has survived.

And where shall we turn for guidance and leadership in this postwar era but to industry's organizations—the trade associations. They have served us wisely and well during the troublous times; they hold forth the promise of even greater and more constructive accomplishments in the days to come.

Reconversion from war to peace brings with it many problems—disposal of surplus goods, relaxation of production and price restrictions, changes in personnel relations, new legislation affecting business, post-war sales expansion.

Trade associations representing united industries will exercise an important influence in the solution of these and related problems.

Waste Chaser's Quiz

For all operating their own power plants the Bureau of Mines of the U. S. Department of the Interior has drafted a "Waste Chaser's Quiz" in co-operation with the National Fuel Efficiency Program that should prove invaluable. Written by practical experts from the coal, oil and electric industry, the illuminating series will prove a profitable guide to all involved. It is available from local or Washington offices.

Export Grain Loadings Off

Grain for export unloaded at tide-water during August totaled 2,446 cars, compared with 3,510 the year previous, a decrease of 30%.

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PARIS, ILL.**

The Morale Of The Employee Is The Morale Of The Supervisor

By PROF. NATHANIEL CANTOR, University of Buffalo

Before Association of Operative Millers

IT is a matter of common sense observation to state that an individual will work more efficiently if he is happy and contented than if he is unhappy and dissatisfied. An employee is assigned to a particular job. He comes to work. *He brings his entire personality to the job.*

While working he is not only a worker but a husband, a father, a possible selectee for military service, an owner of a heavily mortgaged house. He doesn't check his hopes, fears anxieties and worries at the time clock. He carries them with himself to his machine or work bench. Every employee brings the problems arising in his life outside the plant into the plant.

In addition, a great many problems have their origin within the plant. There are questions of wages, hours, working conditions, personal relations with supervision and other employees, insurance, bonds, gasoline, rationing, transfers, and dozens of other possible matters which come up.

What Does Every Employee Want?

THERE is still another series of problems which cause unhappiness and dissatisfaction. They have their origin in the individual's own feelings about himself. What does every employee want? He wants:

1. Security in his work.
2. Recognition on the part of others that he is doing his job well.
3. To feel that he is an important part of a group, that he "belongs."
4. A chance to express himself in some way, large or small, to do something in his own peculiar way.

These four wants (and there are others) are basic. How well they are satisfied will determine how a worker *feels about himself*. The more satisfied he is, the greater will be his self-esteem, the more content will he be and, therefore, the more efficient in what he is doing.

The problems arising out of and within the plant and the feelings an employee has about himself, overlap.

Changes Like Thermometer

PERSONAL problems are brought to work, and work problems, in turn, react upon his home life. In addition, both sets of problems give rise to changing feelings in the worker about his own worth.

His self-esteem is heightened or lowered as the result of what happens within or without the plant. As a re-

sult he feels happy or depressed in various degrees and this, in turn, will be reflected in the kind and the amount of work he does.

Few of us understand why we behave the way we do. One reason for this is, we are unable to think clearly about personal problems because they always involve our own feelings and because these feelings involve emotions *which we do not know are there.*

As a rule, we fight against criticizing ourselves or admitting mistakes. We want to preserve the fine opinion we have of ourselves. There is always a tendency to view oneself in the best light. If we do recognize our shortcomings or errors, it is difficult to admit it. We feel guilty or ashamed and try to cover up and protect ourselves against criticism.

Or Have a Drink

THUS, frequently, in order to avoid admitting that we ourselves have generated a condition or problem, we brush it aside, run away from it, deny its existence, or try to conceal it. All of us do this—very often. This is merely one of many ways by which people attempt to solve their personal problems, but it makes it evident that a good deal of skill is required to *discover* the particular ways by which different people seek to get rid of their emotional conflicts.

It is known that complaints, very often, have nothing to do with the

matter complained about. The complaint is, itself, merely a symptom of a deeper conflict which the person complaining is unaware of. Where a complaint is bona fide, the matter complained of is directly related to it, and if remedied, the complaint disappears.

The fact remains that most employee complaints are not so simply disposed of. The reason for this is fairly obvious. The complaints are symptoms of more or less deep conflicts, *the nature of which is unknown to the employee*, or if known, is a problem which the employee is ashamed or afraid to talk about to anyone.

He remains restless, anxious, ill at ease, and generally in an unhappy frame of mind. He carries the conflict and tries to get rid of his accompanying irritation, annoyance and dissatisfaction by picking on something or someone close at hand. This helps the employee in getting rid of his tension, for the time being.

The basic problem, however, remains. It hasn't been really solved. From the point of view of supervision or management such discontent is undesirable because it is inevitably reflected in lowered or inefficient production, not only of the worker but in the work of fellow employees in the neighborhood, who are also affected by the discontented worker.

Being Different Is Costly

IS there any way in which employees can be helped to face their problems so that they become more content and efficient producers? I believe there is. One of the chief ways in which employees can be helped is for supervision to recognize and to do something about its own problems. This requires explanation.

All of us carry around deep-seated psychological fears. What is it we fear? Sometimes, we are afraid of being ourselves, and often we resent having to be like others. Each one of us wants to be independent and express his own peculiar differences from others. This means that we have to risk incurring the displeasure of others from whom we differ.

We soon learn that the consequences of being different are very costly. We, therefore, learn to submit to the will or demands of others. We learn that is, "to take it on the chin."

A point is reached, however, when we resent being knocked down so much. We want to get up and stand



on our own feet. We get tired of being pushed around. After having taken just so much of being dependent too often we resent not having the chance to be independent. We become restless or ill-at-ease or anxious if we do not have a chance to express our independence.

Particularly At Home

ALL of us can recall incidents in our everyday life where we fluctuate between wanting to assert ourselves and having to repress ourselves. It does not require so much insight to realize that most of us have suffered from having had to become too dependent. In our early years our parents require us to submit to adult patterns. Then our teachers in school and our playmates demand that we conform. In this process of growing up the areas of self-expression are limited too much from the point of view of a well-balanced personality.

In a word, we develop fears of what others will think. We act the way they want and then we supply all kinds of good reasons for so doing. We fail to recognize the *real* reason for conformance. The real reason is that we are afraid of those in power. We carry these fears with us as long as we live without consciously recognizing most of them.

These fears which result from our having been frustrated in the attempt to express ourselves set up all kinds of anxieties and tensions. As adults, we remain in the dark as to the cause of this restlessness. It is generally agreed upon by clinical psychologists that frustrations must lead to aggressions of one kind or another. What happens, then, to the frustrations which we experience in our development because we have been

afraid to express our differences from others?

The answer is general even though complicated. We get rid of our tensions by taking it out on others whether they be our children or friends or employees. The troubled husband takes his tensions out on his wife; the wife takes it out on the children; the children take it out on each other or they kick the dog; the dog slinks away or barks.

Supervisors emotionally exploit employees. Most often they order them around or push them around because these are some of the ways in which they can get rid of their own tensions. Supervisors who become aware of the conflict in themselves between this need to be independent and dependent, who realize that they are using the employees as an "out" for their own dissatisfactions, will be in a better position to guard against injuring the self-esteem of employees.

It is no simple job to discover how to handle employees in order to help them solve their own emotional problems. Supervision is too busy with other duties. They cannot be expected to give too much time to handling the emotional problems of the employees.

In plants employing a considerable number of individuals that job should be given to an employee consultant. The consultant in no way touches problems directly concerned with wages, hours, or conditions of work, or transfers. The qualifications of such a consultant, the specific function he is to perform is quite another story which cannot be entered into here.

The present discussion has merely tried to point out some of the factors which make up worker morale and some of the factors in the personality of supervision which interfere with the creation of good morale among

employees. If only supervision recognized that every individual whether he be the president of the corporation or the errand boy carries the same emotional problems, that they are all filled with these fears of each other, there would follow a greater respect for each other as struggling individuals trying to find a balance between their needs. Knowing our own weaknesses, we would then become strong enough to appreciate the weaknesses and strengths in others.

Another Big Canadian Crop

The 1944 wheat crop in Canada has just been officially estimated at 447,700,000 bu, and while above the 10 year average it is smaller than the large crops of 1939, 1940 and 1942. During the past decade yields have ranged from 180 to 557 million bu., with an average of 350 million. The 23,983,000 acres seeded is 6,400,000 larger than the 1943 sowings.

Small Australian Wheat Crop

For the second consecutive year, Australia expects a greatly reduced wheat harvest because of the small acreage seeded and prolonged dry weather. The 1944 crop may even fall short of the low crop of 108,000,000 bu. harvested in 1943, unless substantial relief is received soon, says the USDA.

Argentina's Flax Crop Off

Argentina's 1944 flaxseed crop, harvesting of which will take place in November and December, may be one of the smallest in many years, says USDA. Heavy frosts in July did considerable damage, but the most serious factor was the continued drought. The crop last year amounted to 61,926,000 bu. from 5,640,000 acres whereas failure to receive good rains this month probably will result in a crop failure on one-third of the 4,848,000 acres sown this year.

Record Yields Forecast


The year's corn crop is estimated by USDA at 3,101,319,000 bu., and wheat production at 1,115,402,000 bu., a record crop.

Carloadings Off 3%

Carloadings of grain and grain products for the first 38 weeks of this year were under those of last year only 3%. Compared with the same period of 1942, however, this year's figures show an increase of 19.1%.

For the weeks ending on the dates shown below carloadings totalled:

	1944	1943	1942
Sept. 16	50,110	54,124	50,581
Sept. 9	43,621	47,768	45,396
Sept. 2	47,862	54,277	44,084
Aug. 26	49,306	54,288	47,467
Aug. 19	49,912	56,116	49,672
38 wks (+000)	1,832	1,888	1,537



Standard of the Industry

A Reputation Earned by Thousands of Installations in All Kinds of Grain and Feed Elevators


"Nu-Hy" Buckets have proved to elevator engineers that it is not the speed of the belt, nor the size of the bucket, nor the size of the elevator leg that brings highest efficiencies. The absolute downright fact is that the shape and design of the bucket and its spacing possibilities are what count most. The above facts are basic and "Nu-Hy" Bucket performance has been a revelation to countless elevator operators—handling greater loads at high, low or intermediate belt speeds—with smooth uniform action, reducing the all-important time factor so essential in grain handling today. As so-called "prime movers" in elevator legs, "Nu-Hy" Buckets can and will exceed your present capacity limitations. An analysis of your present equipment and operations will reveal to you your capacity possibilities. Send for Form No. 76, which will enable us to make guaranteed recommendations. This places you under no obligation, but will demonstrate how you can bring your elevator legs up to their highest potential capacity.

WHAT ITS DESIGN FEATURES MEAN TO YOU

1. The high lip (high front) is scientifically positioned to scoop up a full load . . . retain it and avoid premature discharge at head pulley.
2. The high ends (high sides) are shaped to fit contour of adjoining buckets on belt—reducing gaps between buckets . . . prevent spillage in up leg and overhead pulleys.
3. The bolt hole position avoids "hinging" action when bucket passes over boot and head pulleys . . . directs pick-up and discharge — improves traction.

Screw Conveyor Corporation

707 HOFFMAN ST. HAMMOND, IND.

ENGINEERS  MANUFACTURERS

TRADE MARK REG. U.S. PAT. OFFICE

V-DAY

There is overwhelming sentiment throughout the nation to celebrate victory over Germany with thanksgiving and prayer, and with sober, sensible rejoicing, rather than with boisterous, unrestrained hilarity.

A conviction that America's emotional reaction to victory in Europe can be diverted from riotous and reckless celebration to dignified and purposeful observance is shown unmistakably in a nationwide survey just completed by the National Safety Council.

Reports to the Council of V-Day plans now being made by police and other public officials, industrial concerns and civic leaders reflect virtually unanimous agreement that victory over Germany means only that the first round of the war has been won, and that a hard, all-out fight still lies ahead.

The feeling expressed in these reports might well be summarized—"Cheers for the boys in Europe, prayers for the boys in the Pacific."

Indicative of this is the accent on religious services in V-Day programs now being planned. Because many will have fallen and many will still be in danger, there is a widespread belief that proper leadership, exerted now, can make V-Day a day of commemoration and dedication.

MURDER

(Not Incorporated)

By H. W. PUETZ, Safety Engineer, Milwaukee

Looking for a gas leak with an open flame.
Changing seats in a small row boat.
Looking down or up an open elevator shaft.
Storing acids in unmarked containers.
Passing a car on a hill.
Wearing loose gloves while operating saws, etc.
Horseplay with a so-called unloaded gun.
Keeping loaded heavy caliber shells for souvenirs.
Smoking near inflammable liquids, gases or powder.
Standing under the load of an overhead crane.
Doing 60 miles per hour on synthetic tires (civilian war issue).
Diagnosing your own ailments that would baffle the best physician.
Amateur electricians working on a 23,000 volt line.
Displaying a large roll of money in public.
The intoxicated driver (male or female).
Crawling under a long line of freight cars to save time or climbing between cars for the same reason.
Beating the train to the crossing.
Using electrical gadgets while in a bath tub of water.
Inserting pennies and nails for electric fuses.
Stepping out behind parked cars into fast lane of traffic.
Applying air pressure to ordinary metal drums to get heavy oil or frozen liquids out of drum.
An inexperienced person with a vial of radium.
The novice who can do any job while a professional hesitates.
A playboy aviator hedge-hopping and buzzing the ground crew.
"To hell with the safe way, I'll do it my way."

C. C. C. Fumigants Plus Practical Application — GET RESULTS!

Over 4,200 EVER NORMAL granary bins treated in 1943—8½ million bushels of wheat with guarantees against all insect infestation and against re-infestation for a ten-month period.

Largest Grain Fumigation Contract Ever Undertaken



Fully Equipped For Any Fumigation

Contract awarded July 1. 360 bin sites over 6,500 square miles. First fumigation completed all bins August 26, 1943. Only nine bins graded live weevil under U. S. Grain Standards at expiration of contract.

COOK CHEMICAL CO.

2020 Wyandotte Street Kansas City 8, Mo.

GRand 5244

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THE BULLDOG

A bulldog is neither the largest nor the strongest. He's a tough fighter because he holds on—has courage and tenacity.

Advertising's a great selling force when it uses bulldog tactics. As successful purveyors of equipment and services know so well, to be effective the campaign must be continued issue after issue. It must be consistent if a business is going to be erected on a solid foundation.

Look to the "Bulldogs" for better, more efficient gratification of your requirements.

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4415 Stevens Ave.
Minneapolis, Minn.

JAMES AULD—Sec'y
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31st & Glenhurst
St. Louis Park, Minn.

Trucks For Sale

Four-wheel trucks are being offered at \$32.50 "as is" f.o.b. present location. Information is available from the Treasury Procurement Regional Office, 20 Houston St. N. E., Atlanta 2, Ga.

July Grind Up

During July 1,002 mills ground 42,342,335 bu. wheat compared with 41,359,521 bu. ground by 975 mills during June and 40,053,335 bu. ground by 1,013 mills during July of 1943.

Corn Grind Up

During August the 11 corn refiners ground 9,708,196 bu corn for domestic consumption compared with 8,963,461 last month and 10,213,782 the year previous.

Permits Govern Lake Carriers

Due to the congestion at receiving elevators, lake carriers must obtain a permit from ODT before loading grain bottoms after Sept. 18.

Early Lake Close

Due to the glut at unloading elevators, lake movement of grain is expected to slacken its record breaking pace and winter cargoes will tie up earlier than at anytime since the outbreak of the war.

Decreased Loadings Predicted

A 8.1% decrease in the cars loaded with grain during the last quarter of the year is predicted by the thirteen Shippers Regional Advisory boards. That won't offer much of a rest to the busy elevator crews because the tonnage is so much greater than in average years. Actually 434,575 cars of grain were loaded during the last quarter of 1943, whereas 399,574 cars are predicted this year. While 251,427 cars of flour, meal and other mill products were loaded last year, it is estimated 250,973 will move this last quarter.

Love Beam

RAF bombing planes usually take with them carrier pigeons. Now it appears that these marvelous birds come in home on a love beam. Just before he is taken away a male bird is shown the hen he is particularly fond of. That makes him hurry home. If he has a rival, he is permitted to see his sweetie billing and cooing with him. It works the same with the female. The fastest recorded speed of an RAF pigeon (68.7 miles per hour), was made by a notorious jealous hen.

The newspaper you are reading probably is printed on Canadian newsprint. Canada is by far the largest producer of newsprint in the world...In spite of her terrific war effort, Canada is sending more newsprint to the U.S. than she did at the start of the war. A large part of it goes in direct support of our own war effort, because American production has decreased 24% and our other markets have almost disappeared...In our crucial year of 1941 Canadian production of newsprint was more than three times that of the U.S. and everybody knows how much paper a bureaucrat can use.—Walter Winchell.

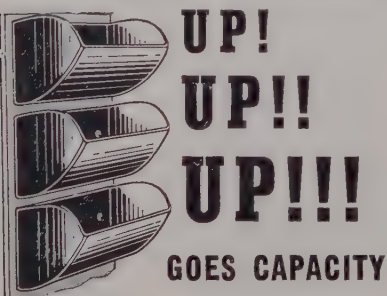
HERE'S WHERE YOUR GAS IS GOING



mineral
600-0511

SOURCE: PAW

M-48



Efficiency multiplied! Thousands upon thousands of extra bushels of grain elevated! That's the "history" of the

CALUMET SUPER CAPACITY CUP ELEVATOR

The only elevator bucket with a Logarithmic curve . . . and it's "The Curve That Counts."

Send for form 35. Learn how much greater guaranteed capacity you can get from your elevator legs.

B. I. WELLER CO.

327 S. La Salle St. Chicago 4, Ill.

Lucellan Luxury

If meat gets much higher, a dash of gravy is going to be a distinguished touch to the masculine necktie.—Ohio State Journal.

The American Dental Association reports that less than 10 out of every 100 American children and less than 2 out of every 100 American adults have normally healthy mouths.

Should Know Better

"A man's good looks are often spoiled when he sneers," says a woman writer.

Especially when he sneers at a bigger man.

Loved Land

The colored private, a passenger on a ship crossing the ocean, became seasick. His buddy remarked: "You all is just a lan'lubber."

"That's right," replied the private. "Dey ain't no argument dere. Ah's a lan'lubber and ah's jest findin' out how much ah lubs it."

Nearly 4,000,000 motor vehicles went out of use in 1942 and 1943 and have not been replaced, according to registration statistics compiled by the Public Roads Administration of the Federal Works Agency.

Smart Guy

An ambulance arrived at the scene of an accident to rescue the badly injured driver. Carefully placing the semi-conscious man on the stretcher, the attendants lifted him into the ambulance. Dazed, the patient glanced back at his car. Suddenly his eyes opened wide, and he turned to the stretcher bearers.

"Say, fellows," he gasped, "would you have time to take the tires off my car and put them in here with me?"

WAS HE LUCKY AT POKER?

IN A NATION at war a lot of things are being diverted to new uses. Rubber is going to the armed forces, tin practically has disappeared, aluminum is going into airplanes, but 32,000 coins which Dr. Henry Hurd of East St. Louis, Illinois, began to save ten years ago, are going to buy War Savings Bonds.

The coins, consisting of approximately 16,000 nickels and 16,000 pennies, were to have gone into an educational fund for his two young sons. Instead, they will be used for America's war effort, Dr. Hurd said, until the war is over. Additional nickels and pennies, saved by the boys will also go for the same purpose.

He Likes Them

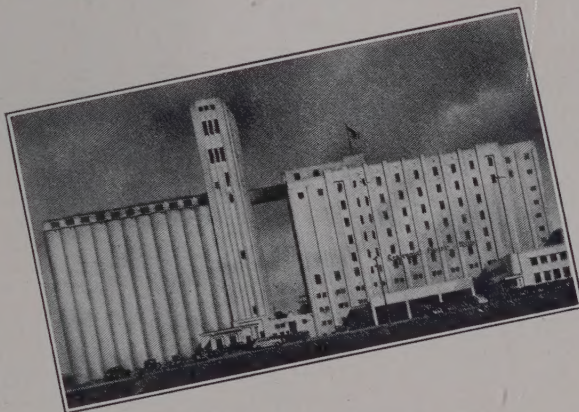
I want to congratulate you on both the June and July issues of "GRAIN." I found them both very instructive. The article entitled: "Handling It Pneumatically" by William Littlejohn Philip was most illuminating.—R. B. Pow, Reliance Grain Co. Ltd., Fort William.



For
FAR MORE
PROTECTION



Against Deterioration Caused by Moisture



A typical B. J. Many Company job of weather-proofing that defies time and the elements.

Excessive movement causes elevators to crack . . . and cracks invite seepage of destructive moisture.

To keep cracks permanently bridged, weather-proofing material must have plenty of elasticity and must be built up to a substantial thickness.

Are one, or two, or three coats enough?

The B. J. Many Company are firm in the belief that FOUR complete coats are necessary to do a job that will last indefinitely . . . and their belief is based on the fact that elevators weather-proofed by the B. J. Many Company as long as *twelve years ago still* defy moisture and show no signs of "cracking up".

A B. J. Many job costs more, it's worth more; it lasts longer . . . and that's what counts. Cheap materials and faulty workmanship represent false economy.

Why not plan now on their greater protection? Write

B. J. MANY CO.
30 N. LA SALLE ST. CHICAGO, ILL.

30 N. LA SALLE STREET CHICAGO, ILL.
DETROIT, MICH.—213 STATE STREET BALTIMORE, MD.—BALTIMORE LIFE BLDG.

R. B. Pow a Federal Candidate

Currently a Director, as well as a past president of SOGES, four times Mayor of Fort William, and an outstanding leader in community affairs for many years, R. B. Pow, Reliance Grain Co. Ltd., was elected Progressive Conservative candidate in Fort William electoral district at a convention just held. He was elected on the first ballot. Those SOGES members wishing to cast their vote for this all-time winner may reach him at Box 142.



Makes Us Blush

Once a year the duty of being a secretary to a bunch of men causes you to have the unpleasant task of sending out statements covering annual dues, and the only thing that is a mystery to me is how you are able to run such an association on the small amount collected per person. Anyhow, find my check enclosed covering annual dues and subscription to "GRAIN."

Saw in the American Miller a picture of yourself and comments about your being made secretary of the International Institute of Milling Technology. Let me extend my heartiest congratulations.

Give my regards to the bunch—Paul E. Blodget, Superintendent, Weidlocher & Sons, Springfield, Ill.

Horrible Thought

What would you think of our fighting men if they returned the captured Pacific islands to the Japs without a struggle—even before they got to Tokyo?

So would we . . .

And what do you think our fighting men will think of those who hold our War Bonds for a short time and then redeem them?

Says It's Valuable and Interesting

I have read a few copies of "Grain" and found it contains valuable information and is very interesting. Please enter my subscription.—Buel Neville, Ass't Foreman, Wheat Elevator, National Biscuit Co., Niagara Falls, N. Y.

SUPERINTENDENT WANTED for Soybean Processing plant in Illinois; or experienced Expeller operator who can handle men, maintain machinery and production, competent to fill position of Superintendent. Good opportunity for man with right education, experience and character. State full information in first letter. All replies confidential. Address 1-S-1, % "GRAIN," 2800 Board of Trade, Chicago 4, Ill.

Bright Future for Soybeans

Greatly expanded use of soybeans both in industry and for food and livestock feed are forecast by Dr. O. E. May, chief in charge of the ARA's four regional research laboratories.

"It is possible to mention only a few of the many lines of research now being prosecuted," Dr. May told the twenty-fifth annual meeting of the American Soybean Association at Urbana, Ill., this month, in reviewing future possibilities of soybean protein in industry. "In the past, plastic materials, adhesives, and paper coatings have resulted from such research, and films and fibers made from soybean protein now seem destined to assume industrial importance.

"The chemical and physical properties of soybean protein are most complicated, but those features which contribute to its complexity are the very ones which lend it valuable properties. The intricacies of the various protein molecules are slowly but certainly being unravelled, and with each new advance in our understanding of the chemistry of soybean protein, new possibilities are presented for the improvement of products made from soybean meal with consequent enhancement of their value."

PRAYER — 1944

Dear Lord,
Lest I continue
My complacent way,
Help me to remember
Somewhere "out there"
A man died for me today.
As long as there be war,
I then must
Ask and answer,
"Am I worth dying for?"

The Finishing Touch
Bradford Dyeing Assn.
New York City

Nonchalance

A gangster rushed into a saloon shooting right and left, yelling, "All you dirty skunks get outta here!"

The customers fled in the hail of bullets—all except an Englishman who stood at the bar calmly finishing his drink.

"Well?" snapped the gangster.

"Well," replied the Englishman, "there certainly were a lot of them, weren't there?"

No Answer

Passerby (an angler): How are the fish in this stream?

Angler: I really don't know. I've been dropping them a line every day but I haven't got an answer yet.

SO HOW ABOUT ME, EH?

60%

of the

"Guys Who

Are Getting

\$50.00 a Month"

buy War Bonds to the
tune of \$295,000,000 An-
nually? What about me, eh?

Harbin, Carlson Address Chicago SOGES

Charles E. Harbin, Manager, Underwriters Grain Ass'n, addressed the Chicago SOGES Chapter's meeting this month on "The Grain Inspector, Your Friend."

Frank E. "Slim" Carlson of the same Chicago firm followed with a talk on "Repair, Maintenance, and Lubrication." These two are scheduled to give their addresses before the Kansas City, Omaha and Minneapolis meetings at later dates. Coast Guard Chief R. L. Nicolini urged co-operating in eliminating prevalent smoking around plants.

Emil Buelens, Glidden Co., was appointed chairman of a committee to select a more fitting name for the association, their recommendation to be presented to other chapters and to next year's convention. Serving with him are Mr. Carlson; Russell Maas, Screw Conveyor Corp., representing the Associates; Bill Gassler, Calumet Elevators, for the elevator interests; Leonard Danielson, Arcady Farms Milling Co., feed; Lincoln Scott, Corn Products Refining Co., corn refiners, and Lloyd Forsell, Albert Schwill & Co., malt. Mr. Buelens represented the soybean interests.

Russell Maas was appointed chairman of Associates Night, Dec. 9th. Gilbert Lane, Arcady Farms Milling Co., was selected as chairman of Ladies Night, Jan. 9th, and Lloyd Forsell, assistant chairman. Robert Buckholtz, Huntley Mfg. Co., Brockton, N. Y., was an out-of-town guest.

Keefer to Talk

W. Dean Keefer, Vice President of the Lumbermens Mutual Casualty Co., Chicago, and a frequent speaker on SOGES convention programs, will address the Chicago Chapter's November 14th meeting on "Safety In Your Plant." "Material Handling For Manpower Conservation" is a second feature of this affair.

The annual interesting Associates' Night program is scheduled for Dec. 9th, with the annual Ladies Night slated for January 9th.

Chicago Visitors

Recent visitors in Chicago included Harold Wilber of A. E. Staley Mfg. Co., Decatur, Ill.; Bernard Friel of St. Paul; Victor Reid of Hart-Carter Co., Minneapolis; Frank Peterson, Clifton, (N. J.) Flour Mills, and Henry Richardson, Richardson Scale Co., Clifton, N. J.

Can Look For Toledo Chapter

I will do all I can to help form a Chapter here.—Jim Kier, National Milling Branch of National Biscuit Co., Toledo.



S-H-H-H!

**ELEVATOR OPERATORS
NO LONGER CONSIDER FUMIGATION
SOMETHING TO *Blush* ABOUT**



... for safe and effective fumigation is now recognized as vital to "good housekeeping".

And use of a fumigant that controls infestation *without injury to grain treated* is considered something to shout about, not to S-H-H-H!

Weevil-Cide fully meets and continuously meets these modern fumigation requirements.

It possesses great and uniform killing power. Fatal to insect life, yet harms only bugs. Leaves no objectionable odor or other bad effects on grain. It is safe to use and involves no fire hazard.

THE *Weevil-Cide* **COMPANY**
THE DEPENDABLE GRAIN FUMIGANT

1110 HICKORY STREET
KANSAS CITY, MO.



CHOICE OF THE GRAIN TRADE



BEFORE

IT TAKES
SURFACITE
AND YEARS OF
ENGINEERING EXPERIENCE

TO DO THE JOB

100% RIGHT

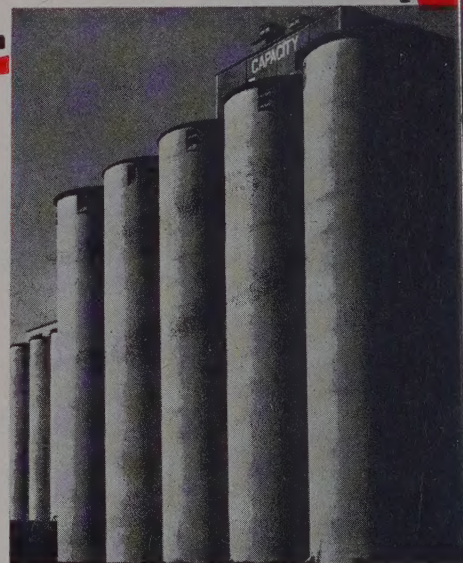
..... and 100% **RIGHT** is the *only* way you want your tanks waterproofed. A quick, slap-on "trick" paint job that washes off after a severe season or two will give you neither satisfactory protection nor will it prove worth a fraction of its cost. Such intolerable work isn't worth a second thought.

No sir, knowing how important it is to keep your elevator water-tight, its contents shielded from the ravages of nature, you want the cracks in your tanks chipped out clean—properly reinforced and patched with a pliable mastic to accommodate tank movements in the future . . . You want the surfaces of your tanks prepared for expert "surgery" with precisely the same care that a leading specialist would prepare a patient for a highly delicate and important operation.

GUNITE

And parallelly, you want the best surgery—whether it be for a minor or a major operation. That's why you'll want **GUNITE**—tougher than the hide of a rhinoceros—to seal repair work. That's why you'll

wish to specify "**SURFACITE**"—our elastic surface coating many times the thickness of ordinary waterproofing—preferred because it compensates for tank movements. That's why you will always demand years of skilled engineering experience such as you get only from . . .



AFTER

Charles F. Walker, Superintendent of Archer-Daniels-Midland Company's "Burlington" Elevator in Council Bluffs, is mighty well pleased with the water-tight job he got using **GUNITE**, "**SURFACITE**," and our proven methods of properly restoring aging concrete—as he will gladly tell you in answer to your inquiry about the advisability of having your rehabilitation work done satisfactorily by . . .